Attorney	's	
Docket		
Number	RPI-007	

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

CTLA4-IMMUNOGLOBULIN FUSION PROTEINS HAVING MODIFIED EFFECTOR FUNCTIONS AND USES THEREFOR

the specification of which	
(check one)	
is attached hereto.	
X was filed on February 2, 1996	as
Application Serial No. <u>08/595,590</u>	4.00
and was amended on(if applicable)	

I do not know and do not believe that the subject matter of this application was ever known or used in the United States before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an issued inventor's certificate in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months prior to the date of this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, that no application for patent or inventor's certificate on the subject matter of this application has been filed by me or my representatives or assigns in any country foreign to the United States, except those identified below, and that I have reviewed and understand the contents of the specification, including the claims as amended by any amendment referred to herein.

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Check one:

- X no such applications have been filed.
- _ such applications have been filed as follows

EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

Country	Application Number	Date of Filing	Priority	
**		(month,day,year)		5 USC 119
			_ Yes	No_
,			_ Yes	No _
Minimum Indiana Indiana	7		_ Yes	No _
***********			_ Yes	No _
			_ Yes	No _

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

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(Application Serial No.)	(Filing Date)	(Status) (patented,pending,aband.)
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W. Hugo Liepmann	Reg. No. 20,407	Amy E. Mandragouras	Reg. No. 36,207
James E. Cockfield	Reg. No. 19,162	Elizabeth A. Hanley	Reg. No. 33,505
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Ralph A. Loren	Reg. No. 29,325	Paul Louis Myers	Reg. No. 35,965
Thomas J. Engellenner	Reg. No. 28,711	Beth E. Arnold	Reg. No. 35,430
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Ann Lamport Hammitte	Reg. No. 34,858	Mark A. Kurisko	Reg. No. 38,944
John V. Bianco	Reg. No. 36,748	Edward J. Kelly	Reg. No. 38,936

Send Correspondence to:

Amy E. Mandragouras, Esq., Lahive & Cockfield, 60 State Street, Boston, MA 02109

Direct Telephone Calls to: (name and telephone number)

Amy E, Mandragouras, Esq. (617) 227-7400

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Full name of first inventor	
Gary S. Gray	
Inventor's signature	Date
Residence	100000000000000000000000000000000000000
32 Milton Road, Brookline, Massachusetts 02146	
Citizenship	
United States of America	
Post Office Address (if different)	

Full name of second inventor
Jerry Carson
Inventor's signature Date
Residence
2 Kent Street, Belmont, Massachusetts 02178
Citizenship
United States of America
Post Office Address (if different)
Full name of third inventor
Kashi Javaherian
Inventor's signature Date
Residence
27 Webster Road, Lexington, MA 02173
Citizenship
Post Office Address (if different)
Full name of fourth inventor
Cindy L. Jellis
Inventor's signature
Residence
Inventor's signature Residence 3 Brian Drive Londonderry, New Hampshire -03053
↑
United States of America
Post Office Address (if different)

Full name of fifth inventor	
Paul D. Rennert	
Inventor's signature	Date
Residence	
2 Sky View Terrace, Holliston, Massachusetts 01746	
Citizenship	
United States of America	
Post Office Address (if different)	

Full name of sixth inventor	
Sandra Silver	
Inventor's signature	Date
Residence	
350 Marlborough Street, Boston, Massachusetts 02115	
Citizenship	
United States of America	
Post Office Address (if different)	

Attorney'	S
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CTLA4-IMMUNOGLOBULIN FUSION PROTEINS HAVING MODIFIED EFFECTOR FUNCTIONS AND USES THEREFOR

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Application Number	Date of Filing	Priority	Claimed
	(month,day,year)	Under 3:	5 USC 119
		_ Yes	No _
		_ Yes	No _
		_ Yes	No _
		_ Yes	No_
		_ Yes	No _
	Application Number		(month,day,year) Under 3. _ Yes _ Yes _ Yes _ Yes _ Yes _ Yes

(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

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Send Correspondence to:

Amy E. Mandragouras, Esq., Lahive & Cockfield, 60 State Street, Boston, MA 02109

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Full name of first inventor	
Gary S. Gray	
Inventor's signature	Date
Residence	
32 Milton Road, Brookline, Massachusetts 02146	
Citizenship	
United States of America	
Post Office Address (if different)	

Full name of second inventor	
Jerry Carson	
Inventor's signature	Date
Residence	
2 Kent Street, Belmont, Massachusetts 02178	
Citizenship	
United States of America	
Post Office Address (if different)	

Full name of third inventor	
Kashi Javaherian	•
Inventor's signature	Date 6/4/96
Residence	
27 Webster Road, Lexington, MA 02173	
Citizenship U S A	
Post Office Address (if different)	

Date

Full name of fifth inventor	
Paul D. Rennert	
Inventor's signature	Date
Residence	
2 Sky View Terrace, Holliston, Massachusett	s 01746
Citizenship	
United States of America	
Post Office Address (if different)	

Full name of sixth inventor		
Sandra Silver		
Inventor's signature	Date	
Residence		
350 Marlborough Street, Boston, Massachusetts 02115		
Citizenship		
United States of America		
Post Office Address (if different)		

Attorney	's
Docket	
Number	RPI-007

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CTLA4-IMMUNOGLOBULIN FUSION PROTEINS HAVING MODIFIED EFFECTOR FUNCTIONS AND USES THEREFOR

the specification of which	
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(ii abblicable)	

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Country	Application Number	Date of Filing	Priority Claimed
		(month,day,year)	Under 35 USC 119
			Yes No
			_ Yes No _

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Inventor's signature	Date
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Citizenship	
United States of America	
Post Office Address (if different)	

Full name of second inventor	
Jerry Carson	
Inventor's signature	Date
lene (en	May 21 1586
Residence	
2 Kent Street, Belmont, Massachusetts 02178	
Citizenship	
United States of America	
Post Office Address (if different)	

Full name of third inventor	
Kashi Javaherian	
Inventor's signature	Date
Residence	
27 Webster Road, Lexington, MA 02173	
Citizenship	
Post Office Address (if different)	

Full name of fourth inventor	
Cindy L. Jellis	
Inventor's signature	Date
	•
Residence	
3 Brian Drive, Londonderry, New Hampshire 03053	
Citizenship	
United States of America	
Post Office Address (if different)	

Date	
	Date

Full name of sixth inventor	
Sandra Silver	
Inventor's signature	Date
Residence	
350 Marlborough Street, Boston, Massachusetts 02115	
Citizenship	
United States of America	
Post Office Address (if different)	

Attorney'	s	
Docket		
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			_ Yes	No _
			_ Yes	No _
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	3. · · · · · · · · · · · · · · · · · · ·		_ Yes	No _
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,	

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Kashi Javaherian	
Inventor's signature	Date
Residence	
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Citizenship	
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Full name of fourth inventor	
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Inventor's signature	Date
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United States of America	
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Paul D. Rennert		
Inventor's signature	Date	
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Sandra Silver	
Inventor's signature	Date
Sarder Selver	Date May 16, 1996
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and was amended on(if applicable)	
(if applicable)	

I do not know and do not believe that the subject matter of this application was ever known or used in the United States before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an issued inventor's certificate in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months prior to the date of this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, that no application for patent or inventor's certificate on the subject matter of this application has been filed by me or my representatives or assigns in any country foreign to the United States, except those identified below, and that I have reviewed and understand the contents of the specification, including the claims as amended by any amendment referred to herein.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

Check one:

- X no such applications have been filed.
- _ such applications have been filed as follows

EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

Country Application Number	Application Number	Date of Filing	Priority Claimed		
		(month,day,year)		USC 119	
			_Yes .	No _	
			_ Yes	No _	
			_ Yes	No _	
			_ Yes	No _	
			_ Yes	No _	

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application. As to subject matter of this application which is common to my earlier United States application, if any. described below, I do not believe that the same was ever known or used in the United States before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to said earlier application, or in public use or on sale in the United States more than one year prior to said earlier application, that the said common subject matter has not been patented or made the subject of an inventor's certificate issued before the date of said earlier application in any country foreign to the United States on an application, filed by me or my legal representatives or assigns more than twelve months prior to said application and that no application for patent or inventor's certificate on said subject matter has been filed by me or my representatives or assigns in any country foreign to the United States except those identified herein.

(Application Serial No.)	(Filing Date)	(Status) (patented,pending,aband.)
(Application Serial No.)	(Filing Date)	(Status) (patented,pending,aband.)

John A. Lahive, Jr.	Reg. No. 19,788	Jeremiah Lynch	Reg. No. 17,425
W. Hugo Liepmann	Reg. No. 20,407	Amy E. Mandragouras	Reg. No. 36,207
James E. Cockfield	Reg. No. 19,162	Elizabeth A. Hanley	Reg. No. 33,505
Thomas V. Smurzynski	Reg. No. 24,798	Matthew P. Vincent	Reg. No. 36,709
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Thomas J. Engellenner	Reg. No. 28,711	Beth E. Arnold	Reg. No. 35,430
William C. Geary III	Reg. No. 31,359	Anthony A. Laurentano	Reg. No. 38,220
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Michael I. Falkoff	Reg. No. 30,833	Jean M. Silveri	Reg. No. 39,030
Ann Lamport Hammitte	Reg. No. 34,858	Mark A. Kurisko	Reg. No. 38,944
John V. Bianco	Reg. No. 36,748	Edward J. Kelly	Reg. No. 38,936

Send Correspondence to:

Amy E. Mandragouras, Esq., Lahive & Cockfield, 60 State Street, Boston, MA 02109

Direct Telephone Calls to: (name and telephone number)

Amy E. Mandragouras, Esq. (617) 227-7400

Wherefore I petition that letters patent be granted to me for the invention or discovery described and claimed in the attached specification and claims, and hereby subscribe my name to said specification and claims and to the foregoing declaration, power of attorney, and this petition.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first inventor	
Gary S. Gray	
Inventor's signature	Date
Residence	
32 Milton Road, Brookline, Massachusetts 02146	
Citizenship	
United States of America	
Post Office Address (if different)	

Full name of second inventor	
Jerry Carson	
Inventor's signature	Date
Residence	
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Citizenship	
United States of America	
Post Office Address (if different)	

Full name of third inventor	
Kashi Javaherian	
Inventor's signature	Date
Residence	
27 Webster Road, Lexington, MA 02173	
Citizenship	
Post Office Address (if different)	

Full name of fourth inventor	
Cindy L. Jellis	
Inventor's signature	Date
Residence	
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Citizenship	
United States of America	
Post Office Address (if different)	
•	

Full name of fifth inventor	
Paul D. Rennert	
Inventor's signature, and kenned	Date 9 MAY 1996
Residence	
2 Sky View Terrace, Holliston, Massachusetts 01746	
Citizenship	
United States of America	
Post Office Address (if different)	

Full name of sixth inventor	
Sandra Silver	
Inventor's signature	Date
Residence	
350 Marlborough Street, Boston, Massachusetts 02115	
Citizenship	
United States of America	
Post Office Address (if different)	

Attorney	's	
Docket		
Number	RPI-007	

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

CTLA4-IMMUNOGLOBULIN FUSION PROTEINS HAVING MODIFIED EFFECTOR FUNCTIONS AND USES THEREFOR

the specification of which	
(check one)	
is attached hereto.	
X was filed on February 2, 1996	as
Application Serial No. <u>08/595,590</u>	****
and was amended on	
(if applicable)	

I do not know and do not believe that the subject matter of this application was ever known or used in the United States before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an issued inventor's certificate in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months prior to the date of this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, that no application for patent or inventor's certificate on the subject matter of this application has been filed by me or my representatives or assigns in any country foreign to the United States, except those identified below, and that I have reviewed and understand the contents of the specification, including the claims as amended by any amendment referred to herein.

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Country	Application Number	Date of Filing	Priority	Priority Claimed		
		(month,day,year)	Under 3:	5 USC 119		
			_ Yes	No _		
			_ Yes	No _		
			_ Yes	No_		
			_ Yes	No _		
			_ Yes	No _		

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Inventor's signature

Residence

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Jerry Carson	
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Full name of third inventor	
Kashi Javaherian	
Inventor's signature	Date
Residence	
27 Webster Road, Lexington, MA 02173	
Citizenship	
Post Office Address (if different)	

Full name of fourth inventor	
Cindy L. Jellis	
Inventor's signature	Date
Residence	
3 Brian Drive, Londonderry, New Hampshire 03053	
Citizenship	
United States of America	
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Paul D. Rennert		
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2 Sky View Terrace, Holliston, Massachusetts 01746		
Citizenship		
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Post Office Address (if different)		****

Full name of sixth inventor	
Sandra Silver	
Inventor's signature	Date
Residence	
350 Marlborough Street, Boston, Massachusetts 02115	
Citizenship	
United States of America	
Post Office Address (if different)	

new

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Gary S. Gray, Jerry Carson, Kashi Javaherian, Paul D. Rennert and Sandra Silver

Cont.nvation of Serial No.: 09/227,595

Filed: January 8, 1999. Le center 20, 2007

For: CTLA4-Cy4 Fusion Proteins (as amended)

Attorney Docket No.: RPN-001

Group Art Unit: 1642

Examiner: Helms, L.

Assistant Commissioner for Patents Washington, D.C. 20231

Certificate of First Class Mailing (37 CFR 1.8(a))

I hereby certify that this correspondence is being deposited with the United States Postal Service as Institutes man in an envelope addressed to: Assistant Commissioner for Patents,

Box falent Application Washington, D.C. 20231 on the date set forth below.

December 20, 200 Date of Signature and of Mail Deposit

Registration No. 43,270

Attorney for Applicants

Label No. EL 833315914US

DECLARATION UNDER 37 C.F.R. 1.131 BY

GARY S. GRAY, JERRY CARSON, KASHI JAVAHERIAN, PAUL D. RENNERT

AND SANDRA SILVER

Sir:

We, Gary S. Gray, Jerry Carson, Kashi Javaherian, Paul D. Rennert And Sandra Silver declare:

We are the inventors of the subject matter described and claimed in the 1. above-referenced patent application.

2. Prior to July 11, 1994, the invention described and claimed in the above-referenced application was completed in this country, as evidenced by the following:

-2-

A. Prior to July 11, 1994, we were in possession of a cloned CTLA4Ig molecule which was producing large amounts of active protein in CHO DG44 cells.

Page A-1 of Appendix A describes amino acid modifications to the Ig portion of the CTLA4Ig molecule. Deletion of the CH₂ domain from γ 1 and mutations to amino acids 235 and 237 in γ 4 are described.

Page A-2 of Appendix A describes amplification of the mutated $\gamma 4$ Hinge-CH₂-CH₃ region and the cloning of the mutated $\gamma 4$ into pNRDSH/hCTLA4 to replace the existing $\gamma 1$ Hinge-CH₂-CH₃.

Page A-3 of Appendix A describes a second method which involves the use of nested PCR to generate a mutated $\gamma 1$ (having an L to A substitution at amino acid 234, an L to E substitution at amino acid 235, and a G to A change at amino acid 237) from hCTLA4Ig and the cloning of the mutated $\gamma 1$ back into hCTLA4 pNRDSH.

Pages A-5 and A-6 show primers for use in making mutated forms of CTLA4Ig.

The notebook pages submitted as pages A-1 through A-7 of Appendix A demonstrate that we completed the claimed invention in this country prior to July 11, 1994.

B. In addition, as shown on page A-8 of Appendix A, prior to July 11, 1994, we demonstrated that mutated forms of CTLA4Ig effectively competed with biotinylated CTLA4-Ig for binding to B7.

In the experiment presented at the bottom of the page B7Ig was put onto plates. Biotinylated CTLA4Ig was added to the plates in a fixed amount. Test forms of CTLA4Ig were added in serial dilutions to test for their ability to compete for binding to B7 on the plate. In this type of assay as the amount of an effective competitor is increased, the amount of biotinylated CTLA4Ig that binds decreases. This leads to a decrease in the optical density readout. Unlabelled CTLA4Ig (left row) was used as a positive control.

The data show that samples #2, #3, and #4 (in rows 2, 4, and 5, respectively) effectively competed with unmodified CTLA4Ig for binding to B7. As indicated in the table in the middle of the page, sample 2 was oncoCTLA4-my4; sample 3 was IgLCTLA4- γ 1; and sample 4 was IgLCTLA4- γ 1.

These data demonstrate that the modified CTLA4Ig molecules were still able to bind to B7.

Each of the dates deleted from pages A-1 through A-8 of Appendix A are prior to July 11, 1994.

We have been warned that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 or the United States Code, and that such willful and false statements may jeopardize the validity of the subject application or any patent resulting therefrom, and declare that all statements made of our own knowledge are true and that all statements made on information and belief are believed to be true.

Date: Oct. 4, 7001	Signed: Sary S. Gray
Date:	Signed: Jerry Carson
Date:	Signed:Kashi Javaherian
Date:	Signed:Paul D. Rennert
Date:	Signed:Sandra Silver

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Gary S. Gray et al.

Serial No.: 08/595,590

Filed: February 2, 1996

For: CTLA4-Immunoglobulin Fusion Proteins Having Modified Effector Functions and Uses

Therefor

Attorney Docket No.: RPI-007

Group Art Unit: 1806

Examiner: Eyler, Y.

Assistant Commissioner for Patents Washington, D.C. 20231

Certificate of First Class Mailing (37 CFR 1.8(a))

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 $\frac{2-20-98}{\text{Date of Signature and of Mail Deposit}}$

By:

Giulio A. DeConti, Jr.

Reg. No. 31,503

ASSOCIATE POWER OF ATTORNEY

Sir:

The undersigned attorney has the power of attorney in the subject application. He hereby grants an associate power to:

> Megan E. Williams, Ph.D. Registration No. P43,270 Lahive & Cockfield, LLP 28 State Street Boston, MA 02109

Please continu	e to forward all written and telephonic communications to	Amy E.
Mandragouras	at the address and telephone number listed below.	

Respectfully submitted,

Giulio A. DeConti, Jr.
Registration No. 31,503
Attorney for Applicants

LAHIVE & COCKFIELD, LLP 28 State Street Boston, MA 02109 Tel. (617) 742-4214

Dated: February 20, 1998